Artículo de investigación

Labor productivity as a source for effective development of production

La productividad laboral como fuente para el desarrollo efectivo de la producción
Produtividade do trabalho como fonte para o desenvolvimento efetivo da produção

Recibido: 26 de abril de 2019. Aceptado: 20 de mayo de 2019

Written by:
Viktor A. Osipov (Corresponding Author)[175]
Elena V. Krasova[176]

Abstract

In traditional and modern economic theory, labor is considered as the most important factor in development of production. Because of this, most scientists studied the issue of efficiency for industrial production by assessing the factors of productivity growth. The significance and value of increasing economic efficiency as a scientific and practical task, determine the difficulties of a methodological nature in measuring labor productivity and justifying its role in the long-term development of an enterprise. The purpose of this article was to characterize the economic category of "labor productivity" in the terms of improving efficiency for industrial production. The methodological basis of the present article are the general provisions of the modern economics, especially the theory of labor value, theory of social production, the modern theory of efficiency, theory of firm, production and costs, and the concept of innovative development. The authors considered measurement methods and substantiated the main criterion of labor productivity, and presented a scheme for calculating labor productivity on the basis of the individual value of the product. This article examines the possibility of obtaining cost savings (additional profit) as a result of increased productivity. These savings are considered as the basis for formation of innovative funds in the enterprise.

Keywords: labor productivity, industrial production, production efficiency, methods of measuring productivity, natural method, cost method, cost savings, additional profit, innovative fund of an enterprise.

Resumen

En la teoría económica tradicional y moderna, el trabajo es considerado como el factor más importante en el desarrollo de la producción. Debido a esto, la mayoría de los científicos estudiaron el tema de la eficiencia para la producción industrial al evaluar los factores del crecimiento de la productividad. La importancia y el valor de aumentar la eficiencia económica como una tarea científica y práctica, determinan las dificultades de naturaleza metodológica para medir la productividad laboral y justificar su papel en el desarrollo a largo plazo de una empresa. El propósito de este artículo fue caracterizar la categoría económica de "productividad laboral" en términos de mejorar la eficiencia de la producción industrial. Las bases metodológicas del presente artículo son las disposiciones generales de la economía moderna, especialmente la teoría del valor del trabajo, la teoría de la producción social, la teoría moderna de la eficiencia, la teoría de la empresa, la producción y los costos, y el concepto de desarrollo innovador. Los autores consideraron los métodos de medición y confirmaron el criterio principal de la productividad laboral, y presentaron un esquema para calcular la productividad laboral sobre la base del valor individual del producto. Este artículo examina la posibilidad de obtener ahorros de costos (ganancia adicional) como resultado de una mayor productividad. Estos ahorros se consideran como la base para la formación de fondos innovadores en la empresa.

Palabras claves: productividad laboral, producción industrial, eficiencia de producción,

[175] Doctor of Economics, Professor of Department of Economics and Management; Email: professorosipov17@mail.ru Phone: 8 (902) 481-97-59
[176] Candidate of Economic Sciences, Associate Professor of Department of Economics and Management; Email: elena_krasova@rambler.ru; Phone: 8 (908) 993-65-45 Vladivostok State University of Economics and Service Vladivostok State University of Economics and Service690014, Russia, Vladivostok, ul. Gogol, 4141 Gogol Street, Vladivostok, Russia, 690014

métodos de medición de la productividad, método natural, método de costo, ahorro de costos, ganancias adicionales, fondo innovador de una empresa.

Resumo

Na teoria econômica tradicional e moderna, o trabalho é considerado o fator mais importante no desenvolvimento da produção. Por causa disso, a maioria dos cientistas estudou a questão da eficiência da produção industrial, avaliando os fatores de crescimento da produtividade. A importância e o valor de aumentar a eficiência econômica como uma tarefa científica e prática determinam as dificuldades de natureza metodológica na medição da produtividade do trabalho e justificam seu papel no desenvolvimento de longo prazo de uma empresa. O objetivo deste artigo foi caracterizar a categoria econômica de "produtividade do trabalho" em termos de melhoria da eficiência da produção industrial. A base metodológica do presente artigo são as disposições gerais da economia moderna, especialmente a teoria do valor do trabalho, a teoria da produção social, a moderna teoria da eficiência, a teoria da empresa, a produção e os custos, e o conceito de desenvolvimento inovador. Os autores consideraram métodos de medição e fundamentaram o principal critério de produtividade do trabalho, e apresentaram um esquema para calcular a produtividade do trabalho com base no valor individual do produto. Este artigo examina a possibilidade de obter economia de custos (lucro adicional) como resultado do aumento da produtividade. Essas economias são consideradas como base para a formação de fundos inovadores na empresa.

Palavras-chave: produtividade do trabalho, produção industrial, eficiência da produção, métodos de medição da produtividade, método natural, método de custo, redução de custos, lucro adicional, fundo inovador de uma empresa.

Introduction

Increasing labor productivity, and the associated increase in the efficiency of industrial production are among the most fundamental economic problems. Despite the fact that modern countries are covered by innovative developmental waves, it should be understood that any research activity is based on an industrial component. The development of a post-industrial economy is only possible on a solid foundation of productivity growth in the sphere of material production. The search for new approaches, optimization of measurement methods and justification of the labor productivity role in the development of an enterprise are carried out in the process of improving management systems and motivational mechanisms based on long-term profit. The scientific category of “labor productivity” is a complex and multidimensional concept, viewed from a scientific, technical, economic, and social point of view (Abalkin et al, 1987; Sink, 1989; Stiglitz et al, 2009). Nowadays, despite the extensive scientific background, there is no complete and systemically consistent concept of this concept as an object of management, yet. As a rule, labor productivity is considered as an indicator for characterizing the productivity (efficiency) of labor, which reflects the estimated quantity of products per unit of time. At the same time, significant gaps remain in the study of labor productivity dynamics as a general process affecting many parameters of scientific and technological progress and socio-economic development. A close analysis of the classical theory of labor productivity with various microeconomic theories is also performed, and their synthesis and convergence are investigated. Great merit in the evolution of views on the labor productivity role in improving production efficiency belongs to Western, Soviet, Japanese specialists. Started from the studies of A. Smith and J. B. Say, and before the modern Nobel laureates, many recommendations were developed about the problems of productivity growth and resource saving in industrial enterprises. Modern scientific literatures in this field can be divided into three large groups (Mardani et al, 2014; Ardakani et al, 2015; Lima et al, 2018; Nisawa, 2018).

1. General questions about the definition of labor productivity and its role in the development of the company. It explores the role of labor productivity in optimizing firm size, growth rates, management policies, etc. (Sink, 1989; Shash & Borodin, 2015; Tang, 2017; Üngör, 2017).

2. The study of the relationship between labor productivity and production efficiency. The subject of these researches is the numerous dependencies between the individual parameters of technological and / or economic processes in an enterprise that characterize the dynamics of productivity and efficiency (Tarancón et al, 2018; Rada & Fuglie, 2018; Nakamura et al, 2019).
3. Consideration of the relationship of labor productivity with the most important socio-economic problems of society. Here, the main view generally is to study the dynamics of employment, wages and total income, under the influence of changes in labor productivity (Chen & Zhou, 2017; Mattsson, 2018; Bjuggren, 2018; Kim & Jang, 2019).

Methodology

The methodological basis of the present article is the general provisions of modern economics, in particular: the theory of labor value, theory of social production, theory of efficiency, theory of the firm, production and costs, as well as the concept of innovative development. In the terms of methodology, the study is based on the general methods of economic and institutional analysis including systematization, synthesis, abstraction, comparisons, expert assessments, as well as approaches used in decision-making practice global management.

Using a systematic approach takes into account the specifics of the object of study. The study is based on the classical conceptual apparatus developed by world science, which allows objectively and reasonably exploring the scientific category of labor productivity and industrial production efficiency. The authors concentrated on the concept that defines the leading role of the labor productivity dynamics in the process of increasing the efficiency of industrial production via scientific and technological progress. In this regard, much attention is paid to the consideration of approaches and methods for measuring labor productivity, as well as justifying its role in the long-term development of an enterprise.

Results

Productivity (the most frequent used term) reflects the efficiency of production. According to the traditional economic theory, the cost of goods and productivity are inversely proportional values. In the Russian (previously Soviet) scientific literature, labor productivity, as a rule, is considered as the ratio of the quantity (cost) of output per unit of working time. This understanding is based on the thesis of the German economist K. Marx that "productive force is the productive force of useful concrete labor and in fact, only determines the degree of efficiency of expedient production activity during a given period of time" (Marx, 2017). Consequently, the indicator of labor productivity level in most cases uses the ratio of a certain volume of output, released per unit of time, to the cost of labor. In modern industrial enterprises, labor costs are usually reflected by the average number of employees belonging to the main production personnel. At the same time, the costs of both living and embodied labor, expressed in various capital objects, are taken into account. The current methodology for determining the efficiency of industrial production relies on a variety of methods for rationing and calculating labor productivity indicators, from which it can be distinguished (Genkin, 2011; Kardas et al, 2017; Shash & Borodin, 2015).

According to Russian scientists, the majority of methods for measuring labor productivity in Russian practice correspond to the realities of industrial enterprises (Shash & Borodin, 2015). The labor productivity of the main production personnel is largely determined by the labor of other categories of workers (auxiliary workers, engineers, managers, etc.), therefore, a better coordination in their joint work, results in the higher the labor productivity of the main workers. Because of this, we consider methodologically correct to measure the labor productivity per one main worker.

Within the framework of industrial economics, the most accurate method for measuring labor productivity is considered to be the natural method and its variety - conditionally natural. However, they may not always be applicable in a modern enterprise: in particular, the measured products must be uniform in their physical properties in different compared periods of time. All kinds of products and work performed (especially in the machine-building enterprises) are almost impossible to be reduced to one type. As a result, depending on the specific conditions of production, this problem was solved using natural, labor and cost methods for measuring labor productivity.

At the Russian enterprises, the most traditional approach was the labor method of measuring labor productivity, which involves the calculation of the labor intensity of production. Labor productivity and labor intensity per unit of output are inversely related; therefore, a decrease

in labor intensity reflects an increase in the labor productivity.
The labor method uses the following labor productivity indicators: labor productivity growth rates by comparing the actual levels of labor intensity at different periods of time, the coefficients of fulfilling production rates, the dynamics of labor productivity using fixed levels of labor intensity. The calculation of productivity growth rates due to the dynamics of labor intensity shows the change in labor productivity in the manufacturing one type of products. In the case of multi-product production, it is necessary to measure the amount of each product in the reporting period of the labor intensity for the corresponding product in the base year and refer to the total time spent on production in the reporting year. This technique is usually used to measure the productivity of workers in areas with repetitive work.

Labor productivity can also be measured using the normative method, i.e. using regulatory labor costs. In this method, performance is often determined by analyzing the performance of the output rate. The higher actual labor productivity in comparison with the standard, results in the greater rate of compliance with the norm. Since in heavy industry, as a rule, standards of time are calculated, but standards of output are not calculated, this indicator is calculated as the ratio of the standard labor input for the production of a certain product to the actual labor input. The rate of fulfillment of norms serves as an indicator of the labor productivity growth in the period from the establishment of the norms of time to their revision. This limits the possibilities of using this method, since the rationing service at the enterprise aims to set such standards of time that would correspond to the actual labor costs for the manufacture of products. If time standards are underestimated, this method will measure the productivity of labor in a biased and inadequate manner.
Advantages of the above methods (natural, labor and regulatory) include ease of calculation, accuracy and visibility of measuring labor productivity. However, there are drawbacks: as a rule, using these methods it is possible to reliably measure the labor productivity of production workers, only within homogeneous jobs or homogeneous products. In modern conditions, it is important to determine the labor productivity of all groups of the enterprise employees (from auxiliary workers to top managers), as well as for the whole range of operations performed and / or for all types of products.

A more general approach to the measurement of labor productivity is cost method. Formally, they make it possible to measure the efficiency of industrial production in an enterprise, in an industry, and in the national economy as a whole. But this is achieved by losing the visibility of the measurement for the created use value and, consequently, reducing the accuracy of labor productivity. It is believed that the cost indicators with a sufficient degree of accuracy reflect the dynamics of production volumes of the industries and the national economy as a whole, i.e. labor productivity at the meso and macro level.

Uncertainty in the methods of measuring labor productivity in modern complex and multi-product production spawned many methods for valuing the productivity of production in enterprises. This set can be divided into two groups: the first takes into account the full value of the output (gross, commodity, realized value), the second is a part of its value, named the cost of own costs (standard cost of production), the newly created value (net, conditionally net), and regulatory clean products.

Gross output is equal to the value of all finished products, semi-finished products produced during the reporting period, as well as industrial works minus products consumed for production needs within the enterprise. Based on this principle, the calculation of gross domestic product is performed using the final value produced by all enterprises in the territory of any country.

In addition to gross output at enterprises, they calculate indicators of marketable and sold products (sales). Commercial products are less gross for the amount of in progress works alterations. This is a part of manufactured products intended for sale. Realized products reflect the total amount of products entering consumption. Numerically, it is equal to marketable output minus changes in balances of unsold goods, i.e. products located in warehouses shipped but not paid for by the buyer.

All these indicators are calculated in the wholesale prices of the enterprise, which over time will be affected technology, market conditions, inflation and other factors change. To correctly measure the dynamics of labor productivity, it is necessary to eliminate the effect of price changes on products. Prices for industrial products must be fixed. Marketable and sold products as a basis for settlements with customers cannot be measured at fixed prices,

therefore, they are not suitable for measuring labor productivity.

A more accurate cost method of measuring productivity is the use of fixed prices of products. The essence of this method is that at a certain point in time the wholesale prices of products are fixed, and they evaluate the output in subsequent years. The correct use of fixed prices is similar to the measurement of products by the conditionally natural method, where products of a certain name are evaluated by one type of it, is conventionally taken as a unit. In monetary terms, the unit price is taken as the unit price of the manufactured use value in the base year, and it measures the output of subsequent periods, although the market value of this unit has changed.

From the second group of cost indicators, the standard cost of processing is applied. This indicator is actively used in the industrial enterprises of the Soviet navy. It reflects the regulatory costs for the production of a single product, including the wages of production workers with charges, as well as general shop, general production, general factory expenses. The main purpose of introducing this indicator is to eliminate the repeated counting of the cost of the raw materials and materials used and the determination of the value of net production. The net product is calculated as the difference between gross output at current prices and material costs (materials, fuel, depreciation). Thus, it is equal to the sum of wages of all categories of workers with charges and profits of the enterprise. Now, net worth is known as value added. The same can be said about the rate of conditionally net output, which differs from net output by the amount of depreciation.

Any cost indicators by their nature are costly characteristics; therefore, the planning of production activities of enterprises always stimulates the corresponding rise in the prices of products. Enterprises based on the development of gross output are interested in producing the most expensive products using more expensive materials. The development of new value indicators led to an economic theory away from solving the problem of measuring labor productivity and stimulating its growth in enterprises. Absolute cost indicators of gross, marketable, clean, conditionally clean products only indirectly (and therefore poorly) characterize labor productivity and the efficiency of production activities in the enterprise.

Discussion

Considering the various indicators of resource efficiency in industrial enterprises, we can conclude that none of them by their nature are not able to fully and accurately reflect the magnitude of labor productivity and production efficiency. While some experts suggest using certain integral indicators of overall efficiency derived from mathematical modeling (Gorchak, 2018), others use a range of interrelated indicators based on multifactor models (Ershova et al, 2015). The third group of scientists proposes to move from planning production and labor productivity to costly indicators (cost and labor) and return to natural planning methods for production of indicators characterizing the usage value of products (Osipov & Krasova, 2017; Latkin et al, 2018).

The complexity of planning for the production development of enterprises using natural indicators does not mean that it is impossible in principle. Each type of products must have its own planning hierarchy. The level of planning for each type of product should be determined by the technical capability of organizing technological and managerial cycles to create specific products. The impossibility of an effective organization for the production process at any high level means that it is necessary to transfer the authority for planning and organizing production to a lower level. With a decrease in efficiency at lower levels, the organization of the production process must move to a higher level of management. Thus, the organizational and personnel management system of an enterprise depends on the production efficiency, which should be based on natural indicators. In this case, labor productivity is not determined by the volume of production per unit of time, but per unit of production (or its use value). The minimum cost of production of a particular product in the entire cumulative technological process shows the maximum productivity of its production. The cumulative technological process is understood as the combination of sequential and parallel processes of turning resources into a finished product and delivering it to the final consumer. At the same time, for the purposes of scientific analysis, a product can be considered as a single, satisfying the specific need of a particular customer, and as an aggregate, satisfying the needs of the whole society. In the first case, we will talk about labor productivity in the production of a particular product (or its consumer effect). Labor productivity, considered throughout the process

chain, should be the main object in the study of social production.

Considering the economic system as a whole (for example, at the level of the national economy), it can be noted that the costs of production, including surplus product m, are equal to the national income, and with a constant amount and quality of labor at this stage of development of society, this value is constant (1 v + m = const.

In the case of growth in labor productivity, this value is distributed to a greater number of units of goods, thereby reducing the cost of each of them. The same can be said about the enterprise, where value-added (net production) is an analogue of gross national income. Minimizing the added costs throughout the production chain will result in minimizing the cost of manufacturing the final product (final result).

Considering the enterprise or industry as a separate part of the total technological process, one can see that total production costs (tc) are made up of consumed means of production (c) and own costs (net value added, or v + m) (2):

tc = c + v + m.

Component (c), in essence, is value added, created at the previous stages of the cumulative technological process. Within a separate enterprise, these costs are only “transferred” to the product being manufactured, and if we consider them in their pure form, without the costs of “moving” through this production system, they are not the costs of this enterprise. That is the reson that why the main criterion of labor productivity and efficiency of social production can be considered the rate of profit, calculated as the ratio of surplus product m to labor input v in a given production system (3):

$$\frac{m}{v}.$$

As a source of data when calculating the rate of profit, you can use the ratio of the company's net profit to the wage fund with deductions. Moreover, the latter is the net (added) value created by the enterprise.

For an enterprise focused on a tough competitive market, the condition for operating efficiency is to minimize product prices. In conditions of price competition, production can be considered as effective, which ensures the minimum cost of production and, accordingly, the maximum profit. At the present stage of economic development, when competition goes to a non-price area, production is considered effective if it provides minimal social costs, or maximum labor productivity. The main factor determining the value of goods in a competitive market is the market pressure on the price of goods to decrease and the forced pressure of the manufacturer on the price of production factors to ensure their own profits. As a result, less cost for each product adds to the product lesds to the higher aggregation of labor productivity and the lower cost of the product for the end user. Because of this, the indicator of productivity growth, which is expressed in reducing the cost per unit for the end user, can be taken as a criterion for evaluating production efficiency in a saturated market.

The real mechanism of formation for the cost of production at each enterprise can be reflected by a specific indicator that we will call it the individual value of the product. The individual cost of a product consists of its individual cost and the standard tax deductions attributable to this product. Taxes can be considered as overhead costs to ensure normal macroeconomic conditions of management. Thus, the part of the profit that is withdrawn by the state from the enterprise cannot be called profit, since these are obligatory payments. The general scheme for calculating the individual cost of the product is presented in Table 1.

Table 1. Procedure for calculating the individual value of the product and labor productivity in an industrial Enterprise

№	Costing Items	Calculation procedure
1	Raw materials	According to the norms of consumption
2	Components, semi-finished products, services of cooperative enterprises	According to the norms of consumption

3	Fuel and electricity for production needs	According to the norms of consumption
4	Returnable waste (deducted)	By selling price
5	Salary of key production workers	At the rate of wages
6	Deductions from workers wages	In percentage of p. 5
7	Maintenance and operation of production equipment	Based on annual average values
8	Preparation and mastering the production	Based on annual average values
9	Compensation of tools wear and devices for industrial purposes	According to the norms of consumption
10	Total direct costs	Amount of item 1 - item 9
11	Overhead costs (calculated for this product)	Based on annual average values
12	General business expenses (calculated for this product)	Based on annual average values
13	Total overhead	п. 11 + п. 12
14	Production cost of the product	p. 10 + p. 11
15	Regulatory tax deductions	At the rate of income tax
16	Individual product value	п. 10 + п. 13 + п. 15
17	Market price of the product	Taking into account supply and demand
18	Profit from product sales	p. 17 - p. 16
19	Net individual product value	p. 5 + p. 6
20	Labor productivity	п. 18 / п. 19

Thus, the total labor productivity index takes into account the whole range of economic relations of an enterprise: the numerator reflects the ultimate efficiency of economic activities related to production, management and sales of products, and the denominator represents the valuation of the product created (added to the economy) by the enterprise.

The amount of value created and the profits earned do not remain constant over time, and change the level of labor productivity under the influence of many factors. The labor productivity dynamics is an important characteristic of the industrial production development. At the level of the national economic system (or the industry as a whole), in order to build a trend of production efficiency, it is advisable to compare labor productivity indicators calculated for different points in time (for example, past and current reporting periods). However, for an individual enterprise it makes sense to compare their individual productivity with the average level of productivity for this society (this industry), since in a competitive and saturated market conditions the basis for profit is the technological advance of the enterprise, manifested in a lower individual cost of the product compared to competitors (industry as a whole). More details about the mechanism of advanced reduction of the individual cost of a product in comparison with the average cost characteristic for the whole society in the conditions of innovative development of the economy is described in the study of Krasova et al. (2018).

The implementation of the enterprise reserves of the labor productivity growth and technological advance lead to real savings in production costs.

Strictly speaking, any technologically sound saving of production resources can be considered as an increase in labor productivity. The fewer products from the previous stages of production required by this enterprise will result in the higher efficiency of the entire production system. The reciprocal of the individual cost of the product characterizes the absolute level of labor productivity in all stages of its production. The rate of decline in the individual cost of the product reflects the rate of growth of labor productivity in all stages of its manufacture, including the previous intermediate stages.
Cost savings lead to the possibility of obtaining additional profit (super-profit) M, which is determined by the formula (4)

$$M = \sum_{i=1}^{n} (Pi - Ci) \cdot Qi \cdot T$$

where n is the number of product types; P is the market price of the product; C is the individual value of the product;Q is the sold quantity of product in physical terms; T is the period of time ahead of the decline in the individual cost of the product compared to the social cost of this product.

In general terms, the savings (or super-profits) M from the growth of labor productivity in the production process of a certain type of product can be calculated as the difference of the integrals (5):

$$M = \int_{t1}^{t2} p(t)q(t)d(t) - \int_{t1}^{t2} c(t)q(t)d(t)$$

or in the form of expression (6):

$$M = \int_{t1}^{t2} [p(t) - c(t)]q(t)d(t)$$

where t1 and t2 are the beginning and end of the period of advancing the decline in the individual value of the product; p (t) is a function of the market price of a product from time t; c (t) is a function of the individual cost of the product from time t; q (t) is a function of the number of sales of a product from time t.

Thus, the above calculation of savings from the growth of labor productivity takes into account the dynamics of the market price, individual value and the volume of sales of the product. It should be noted that the time component (T is the period ahead of the individual cost of the product compared to the social cost) gives formulas (4), (5) and (6) the character of dynamic models that can be used to explain the change in production efficiency under highly competitive conditions, and a saturated market, as well as a justification of the inevitability of technological transitions in the economic development of society.

In practice, in the conditions of economic independence of enterprises, the stimulation of growth in labor productivity occurs, as a rule, by influencing the material interests of the owner and labor collective through economic incentive funds (they can be called incentive funds, bonuses, etc.). It is natural and natural for an enterprise when the formation of a fund of economic incentives occurs at the expense of economy, or super-profits obtained at the expense of advancing reduction of the individual cost (costs) of products compared to the cost of similar products at other enterprises of the industry.

These savings should remain at the disposal of the enterprise and be directed to scientific research, technological improvement of production, or to a material incentive fund. It is advisable that this part of the profit should not be taxed, since it can be the basis for creating a fund for innovative development of an enterprise. The general model of the formation and distribution of profits obtained of an industrial enterprise is presented in Figure 1.

Such a model of formation and distribution of profits, providing for an active and even creative role of workers in increasing labor productivity, does not contradict the world practice of economic incentives and motivation of labor collectives. For example, in the US, large, stably operating firms send up to a third of the additional profit received to bonus payments to personnel. Moreover, the opportunities and prospects for the development of innovation funds for the development of enterprises are quite common practices for a number of countries, which are embodied in various formats (Lazarev & Krasova, 2018; Kuzubov et al, 2018).

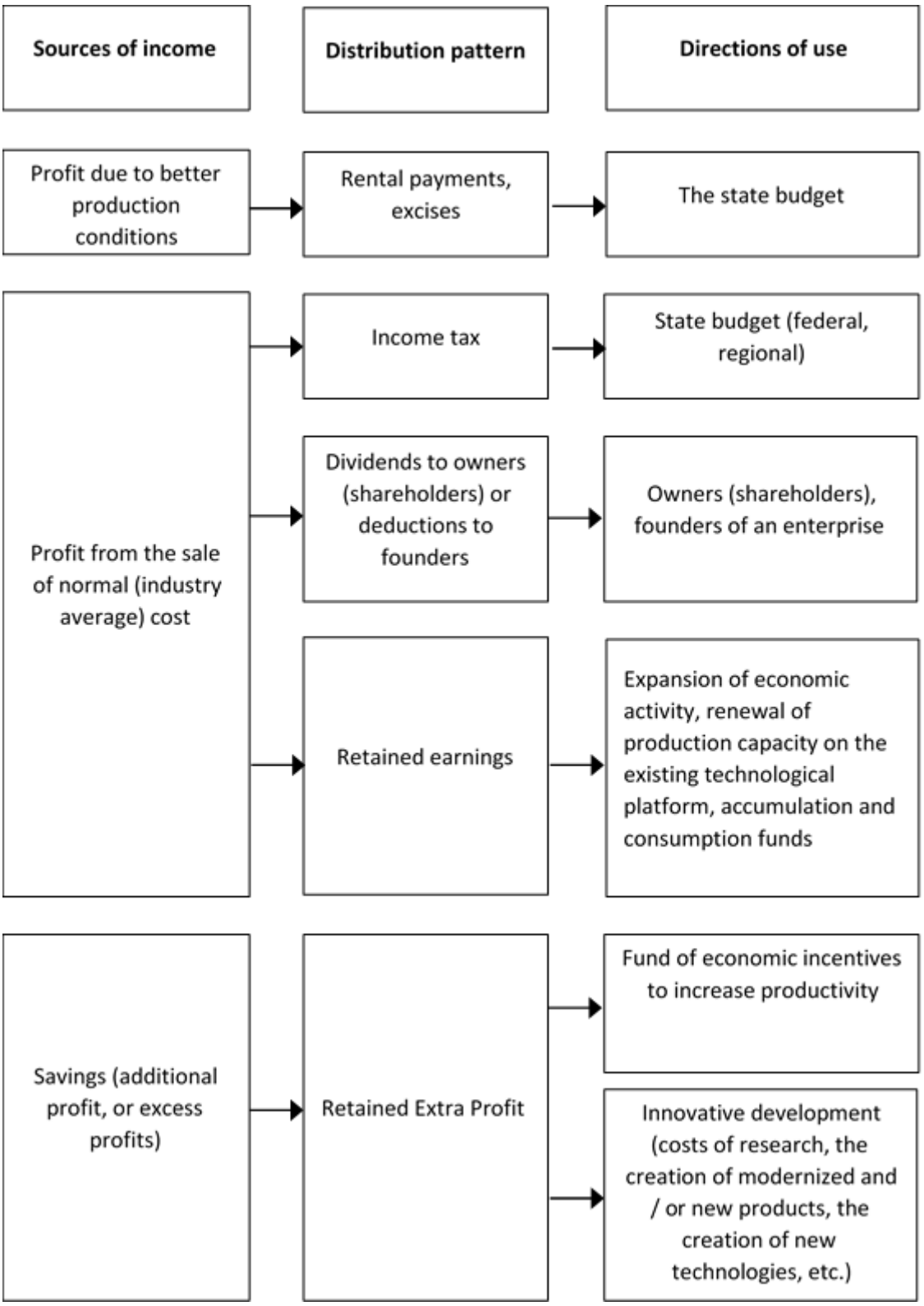

Fig. 1. The general model of formation and distribution of profits obtained of an industrial enterprise, taking into account the factor of productivity growth

The creation of economic incentives for raising productivity and innovation development funds will help sustain the enterprise's interest in increasing the technological level of production and reducing average costs. All enterprises participating in a single industry (or national) technological process, independently will

stimulate an increase in the overall level of industrial production efficiency.

Findings

1. Labor productivity is a complex and multidimensional concept of economics, which has been subjected to comprehensive analysis for many decades. To date, the complete and systemically consistent concept of this concept as an object of measurement and management has not yet taken form. The approaches and methods of measuring labor productivity differ -as a rule- depending on the scientific direction of economic theory.

2. There are a number of traditional and fairly accurate methods for measuring the level of labor productivity as a ratio of results and labor costs. These include natural, labor, regulatory methods, each of which offers specific indicators for measuring performance. However, in the conditions of complex and multi-product production, cost methods that determine labor productivity by means of gross, marketable, net production, as well as fixed prices and standard processing costs have become more common.

3. From the point of view of the social production theory and the methodology for calculating the gross product by value added, one of the main criteria for labor productivity and production efficiency can be considered the rate of return, calculated as the ratio of the surplus product to labor costs.

4. Based on the methodology for dividing expenses according to their economic content into direct and indirect, a scheme is presented for calculating the individual cost of a product and for calculating the labor productivity based on it. The final indicator of labor productivity takes into account the whole range of economic relations of an enterprise: the numerator reflects the ultimate efficiency of economic activities related to production, management and sales of products, and the denominator represents the valuation of the product created (added to the economy) by the enterprise.

5. The systematic increase in labor productivity leads to a technological advancement of the enterprise in comparison with its competitors (the industry as a whole) and to a real saving in production costs. This savings makes it possible to obtain additional profits (excess profits). The calculation of savings from the growth of labor productivity takes into account the dynamics of the market price, individual value and the volume of the product sales, regarding the nature of a dynamic model. Such a model can be used to explain changes in production efficiency in a highly competitive and saturated market.

6. The possibilities of obtaining cost savings as a result of the labor productivity growth induces the enterprise to stimulate the work collective to work even better. Thus, the growth of labor productivity, acting as a source of additional, in the long run tax-free profits, contributes not only to increase the remuneration of owners and employees of the enterprise, but also the creation of an innovation fund on it. Through the formation of innovation funds in enterprises of any industry, it is possible to ensure the technological continuity of the different stages of technological development.

Reference

Abalkin, L. I., Schulz, G., & Dunaeva, V. S. (1987). Proizvoditel'nost' obshchestvennogo truda [Productivity of social labor]. Moscow, Publ. house Mysl. 259 p.

Ardakani, M. P., Lashkarian, A., & Sadeghzadeh, M. (2015). The Translatability/Untranslatability of Poetics: Eliot's" Ash Wednesday" and its two Persian translations. UCT Journal of Social Sciences and Humanities Research, 3(1), 52- 60.

Bjuggren, C. M. (2018). Employment protection and labor productivity. Journal of Public Economics, 157, 138-157.

Chen, J., & Zhou, Q. (2017). City size and urban labor productivity in China: New evidence from spatial city-level panel data analysis. Economic Systems, 41(2), 165-178.

Ershova, M. V., Zharikov, V. D., Zharikov, R. V., & Zharikov, V. V. (1993). The Model of Labour Productivity Growth of the Industrial Company Staff. Organizator proizvodstva, 66-75.

Genkin, B. M. (2007). Organization, regulation and remuneration at industrial enterprises. BM Genkin, M.: NORMA Publishing House.

Gorchak, M.O. (2018). Economic and mathematical methods of measurement of labor productivity in the enterprise. Eurasian Law Journal, 4(119), 369-371.

Kardas, E., Brožova, S., Pustějovská, P., & Jursová, S. (2017). The evaluation of efficiency of the use of machine working time in the industrial company–case study. Management Systems in Production Engineering, 25(4), 241-245.

Kim, H.S., Jang, S.S. (2019). Minimum wage increase and firm productivity: Evidence from the restaurant industry. Tourism Management, Vol. 71. Pp. 378-388.

Krasova, E. V., Klindukh, R. V., & Krasko, A. A. (2018). Cyclicality of innovative development in entrepreneurship. Amazonia Investiga, 7(17), 21-30.

Kuzubov, A. A., Shashlo, N. V., Petruk, G. V., & Korostelev, A. A. (2018). Developing a supply chain subsystem to manage the process of obstacle elimination for the innovative development of business entities. International Journal of Supply Chain Management, 7(5), 621-631.

Latkin, A. P., Maidanevych, Y. P., & Komarov, P. I. (2018). Analyzing and identifying the factors affecting the global supply chain competitiveness of industrial products. International Journal of Supply Chain Management, 7(6), 544-549.

Lazarev, G. I., & Krasova, E. V. (2018). Research and development in China: scope and specifics of innovation process. Amazonia Investiga, 7(14), 73-83.

Lima, A., Mendes, D., & Paiva, S. (2018). Outdoor Navigation Systems to Promote Urban Mobility to Aid Visually Impaired People. Journal of Information Systems Engineering & Management, 3(2), 14.

Marx, K. (2017). Capital: critique of political economy. Litres Publ. 2691 p. (on Rus).

Mardani, M., Lavasani, S. M., & Omidvari, M. (2014). An investigation into DOW and MOND indices with fuzzy logic based on fire and explosion risk assessment in Iran oil refinery, UCT Journal of Research in Science, Engineering and Technology, 2(3): 126-137.

Mattsson, P. (2018). The impact of labour subsidies on total factor productivity and profit per employee. Economic Analysis and Policy.

Nakamura, K., Kaihatsu, S., & Yagi, T. (2019). Productivity improvement and economic growth: lessons from Japan. Economic Analysis and Policy, 62, 57-79.

Nisawa, Y. (2018). Applying van Hiele's Levels to Basic Research on the Difficulty Factors behind Understanding Functions. International Electronic Journal of Mathematics Education, 13(2), 61-65.

OSIPOV, V. A., & KRASOVA, E. K. (2017). Modern Specialization of Industry in Cities of the Russian Far East: Innovation Factor of Dynamics. Revista ESPACIOS, 38(62).

Rada, N. E., & Fuglie, K. O. (2018). New perspectives on farm size and productivity. Food Policy.

Sink, D. S. (1989). Upravlenie proizvoditel'nost'yu: planirovanie, izmerenie i otsenka, kontrol'i povyshenie (Productivity management: planning, measuring and evaluation, control and promotion). Moscow: Progress.

Shash, N. N., & Borodin, A. I. (2015). Indicators and methods for measuring labor productivity and the possibility of their use in enterprises. Uchenye zapiski Petrozavodskogo gosudarstvennogo universiteta, 3-1.

Stiglitz, J., Sen, A. K., & Fitoussi, J. P. (2009). The measurement of economic performance and social progress revisited: reflections and overview.

Tang, M. C. (2017). Total factor productivity or labor productivity? Firm heterogeneity and location choice of multinationals. International Review of Economics & Finance, 49, 499-514.

Tarancón, M. Á., Gutiérrez-Pedrero, M. J., Callejas, F. E., & Martínez-Rodríguez, I. (2018). Verifying the relation between labor productivity and productive efficiency by means of the properties of the input-output matrices. The European case. International Journal of Production Economics, 195, 54-65.

Üngör, M. (2017). Productivity growth and labor reallocation: Latin America versus East Asia. Review of Economic Dynamics, 24, 25-42.